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was at the beginning of the experiment; moreover, it will repeat this performance as often as desired.

The most curious phenomenon of all, the sudden appearance of the air-bubbles in the cells of the annulus, causing the jerking motion by which the spores are scattered, is explained by Prantl * in the following manner:

The interior of the cells of the annulus is lined with a continuous layer of protoplasm which is thickest along the inner, thinner along the radial, and quite thin at the outer walls. This layer can be demonstrated by treating with chloriodide of zinc. (I obtain better results by using a concentrated solution of sugar and sulphuric acid). It must be assumed that this protoplasm, or rather some unknown substance contained in it, absorbs water through the cell-wall, with great avidity and force, while there is no plasmolysis, i.e., the cell-membrane does not permit the water-absorbing substance to pass out of the cell. There will be, consequently, great endosmotic pressure exerted on the contents of the cell, and the air which is present in it will, under this pressure, be absorbed by the water. On the other hand, if, by using glycerine, or similarly acting reagents, the water is abstracted from the cells, the first effect is that their space is diminished, the outer wall gives way, and folds up inward, etc., but as soon as the endosmotic pressure is diminished so that a certain limit is reached, the air which had been absorbed will suddenly be liberated, and the volume of the cell increased correspondingly.

In the living plant, the bursting of the sporangia and the scattering of the spores must be explained in the same way, viz.: by the gradual disappearance of the water from the cells of the drying annulus.

JOSEPH SCHRENK.

Botany at the Buffalo Meeting

OF THE

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE,

AUG. 18TH-24TH, 1886.

The Botanical Club met at 9 A.M., Thursday, Aug. 19th, and held three subsequent meetings, Prof. J. M. Coulter in the chair; Dr. J. C. Arthur, Secretary. Owing to duties as Secretary of

* Berichte d. Deutschen Bot. Gesell., iv., p. 42.

the Biological Section, Prof. Arthur resigned and Dr. N. L. Britton was elected in his place.

A letter was read from Dr. Asa Gray, conveying a revision of the genus *Dodecatheon*, in which he recognizes five species, differing in this from his conclusion, in the last edition of Vol. ii, Syn. Flor. N. A., where all the forms were considered as varieties of *D. Meadia*. The present classification is based on characters of the capsules.

Prof. E. W. Claypole presented some notes on the action of the Potato Rot fungus (*Peronospora infesta*) on the tubers, stating that the mycelium enters at the eyes, where the vascular system reaches the surface, penetrates and destroys it, but leaves the starch-cells intact. Subsequently *Bacterium termo* attacks the latter. The so-called "resting-spores" of *Peronospora* were shown under the microscope.

Prof. F. Lamson Scribner described and illustrated his method of making drawings of minute portions of plants. The apparatus used consists of a Zentmayer dissecting microscope, with the metal base replaced by a wooden one, which slides in a frame hinged to a heavy base board. When in use, the frame is placed vertically and the focal distance adjusted as desired. A Wollaston camera and an adaptor for lenses are attached; drawings are made on tracing paper and transferred by means of a steel point to Bristol board. The final lines are inked with Keuffel & Esser's pen No. 1459. Remarks were made by Prof. Burrill and Dr. Beal.

Dr. W. J. Beal exhibited a cheap and convenient tray to contain the apparatus used by students in laboratory work, and invited criticism. Dr. Farlow remarked on the danger to lenses from the proximity of reagents. Prof. J. H. Pillsbury advocated the use of a board with holes and grooves.

W. H. Seaman read a paper on the occurrence of *Marsilea quadrifolia* in the fish ponds at Washington. (See BULLETIN, xiii, p. 144.) Dr. Beal stated that it had spread extensively in Michigan. Rev. Thos. Monong said that it was now abundant in Concord River, Mass., extending along its banks for miles, to the exclusion of other aquatic plants, being almost as objectionable as *Anacharis* is in Europe. It all appears to have originated

from the station at Bantam Lake, Conn. In reply to a question from Prof. Underwood, Mr. Morong suggested as a possible explanation for its distribution, the influence of aquatic birds, and cited as a similar case the occurrence of *Potamogeton crispus* in Arizona.

Prof. Lucien M. Underwood reported the receipt of *Salvinia natans* from Dr. Demetrio in Central Missouri, and referred to Pursh's statement that it was found in Western New York, but stated that it has not since been collected there.

FRIDAY, AUG. 20TH.

F. V. Coville read a paper on the occurrence of *Aconitum noveboracense*, Gray, n. sp., near Oxford, N. Y.

Prof. T. J. Burrill described some home-made apparatus for the investigation of bacteria.

Mr. Morong exhibited *Potamogeton fluitans* from the Niagara River, where it is abundant, and stated that *P. lonchites*, Tuck., is closely allied, if not identical.

Miss Lillie J. Martin read a paper on Petroleum Spirit (boiling 25°-45° C.) as a preservative of the chemical constituents of plants. The subject was discussed by Professors Seaman and Barnes.

B. E. Fernow exhibited specimens of the chestnut bearing pistillate catkins, similar to those of the Chinquapin, which were found on a single tree growing in the woods in Lehigh Co., Pa. These catkins were about five inches long and composed of a large number of small burrs which when ripe resembled that of *C. pumila*. He had observed the tree for seven years and had never found any staminate catkins. Reference was made to Mr. I. C. Martindale's description of a similar monstrosity near Camden, N. J. (Proc. Phila. Acad. Sci., 1880.) Other teratological examples in various genera were cited in the discussion which ensued.

W. J. Beal read a paper on the escape of seeds of *Sporobolus cryptandrus* when the panicle is moistened.

Prof. C. R. Barnes offered to send on application his key to the Manual of Mosses of N. A.

The Chairman announced the receipt of a letter from Dr.

Gattinger, of Nashville, containing a description of a new species of *Hypericum* from Tennessee.

MONDAY, AUG. 23D.

Prof. F. Lamson Scribner read a paper entitled "Notes on the Orange-leaf Scab in Florida."

Prof. J. H. Pillsbury described a method of making cheap lantern slides from drawings. He employed "tracing gelatine," such as used by lithographers, placing it over a diagram and scratching the lines upon it with a steel point. The gelatine is then placed between glass slips which are bound together and used as an ordinary lantern slide.

Mr. B. E. Fernow distributed circulars of the Fifth Annual Meeting of the American Forestry Congress to be held at Denver, Colo., Sept. 14th-20th, 1886.

Dr. N. L. Britton read a paper on the Composition and Rearrangement of the Columbia College Herbaria, and another on the species of the genus *Anychia*.

The committee appointed to nominate officers for the next meeting of the club, consisting of Professors L. M. Underwood, T. J. Burrill and F. L. Sargent, presented the names of M. S. Bebb for President, and Elizabeth G. Britton for Secretary. They were unanimously elected.

TUESDAY, AUG. 24TH.

Prof. W. J. Beal was elected President *pro tem*.

Prof. E. W. Claypole remarked "On the Appearance of European Immigrant Plants in Summit Co., Ohio."

Prof. F. L. Scribner read a paper on the Botanical Characters of the Black Rot of the Grape.

The following resolutions were then unanimously adopted :

Resolved, That the members of the Botanical Club of the A. A. A. S. heartily thank the U. S. Commissioner of Agriculture for his promptness and energy shown in appointing an able investigator to prosecute the mycological work recently inaugurated in the Department of Agriculture, and in giving him opportunities to study the Fungi which are injurious to cultivated plants. While they are gratified with the beginning made, they express the hope that this work will be still further supported. The Botanists here assembled hereby renew their promise to render the U. S. Commissioner of Agriculture any assistance in their power toward making investigations in any department of Botany.

Resolved, That the hearty thanks of the Botanical Club of the A. A. A. S. be tendered to the Botanical Club of Buffalo for the bountiful hospitality which they have

shown to their brethren from abroad, and not less for the graceful and courteous manner in which this hospitality has been extended, with the promise that wherever our meetings may be held in the future every visiting Buffalo botanist will find a warm reception in our hearts and homes.

The President *pro. tem.* expressed the thanks of the Club to Prof. J. C. Arthur for his valuable services as Secretary in the past and his arduous labors in organizing the present meeting.

The Club then adjourned to meet at 9 A.M. on the second day of the next meeting of the A. A. A. S.

In the Biological Section the following papers were presented: Atavism the Result of Cross-breeding Lettuce, by E. Lewis Sturtevant; The Bulliform or Hygroscopic Cells of Grasses and Sedges Compared, by W. J. Beal; Synopsis of North American Pines based upon Leaf Anatomy, by J. M. Coulter and J. N. Rose; The Development of the Gymnosporangia of the United States, by W. G. Farlow; Plan for Laboratory Work in Chemical Botany, by Lillie J. Martin; A Study in Agricultural Botany, by E. Lewis Sturtevant; Botany of Timber Trees, with special reference to the requirements of Forestry, by B. E. Fernow; Memoranda of a Revision of the North American Violets, by Asa Gray; A Revision of the North American species of the genus *Fissidens*, by C. R. Barnes.

During the meeting of the Association the botanists visited Niagara Falls and Point Abino, Canada, excursions kindly provided by the local committee.

Index to Recent American Botanical Literature.

Abies Engelmannii. (Garden, xxx., p. 100.)

It is stated that this tree succeeds remarkably well in St. Petersburg despite the extreme cold of Russian winters, and that it is not improbable that it will in the future form an important element in the formation of artificial forests in Northern Europe.

Agrimonia Eupatoria. P. Baccarini. "Intorno ad una probabile funzione meccanica dei cristalli di ossalato calcico." (Ann. R. I., Bot. di Roma., i., p. 154, t. xv.)

Amaryllis Atamasco. (Vick's Ill. Month. Mag., ix., p. 207; colored plate.)